REMARKS

This is in response to the Office Action mailed on December 15, 2003. Claims 1-20 were pending in the application and the Examiner rejected all claims. With this response, claims 1, 10 and 17 are amended, and Applicant respectfully traverses the Examiner's rejection.

On page 2 of the Office Action, the Examiner rejected claims 1-20 under 35 U.S.C.§103(a) as being unpatentable over Church U.S. Patent No. 5,149,405 (the Church Patent) in view of Manning and Schütze, Foundations of Statistical Natural Language Processing, MIT Press, 1999 (Manning).

At the bottom of page 2 of the Office Action, the Examiner stated that "Church does not disclose identifying N-best part-of-speech (POS) sequences corresponding to the natural language input." The Examiner also stated that "Manning et al. discloses identifying K-best part-of-speech (POS) sequences". However, what the Examiner did not state is that neither of the references, either alone, or in combination, give any indication, whatever, as to how a plurality of N-best POS sequences could be used to identify base noun phrases (baseNPs).

In fact, the two references cited by the Examiner are simply examples of prior art techniques discussed in the background of the present application. For example, the Church patent treats POS tagging and noun phrase identification as two completely separate algorithms. Church specifically teaches the use of dynamic programming algorithms (such as the Viterbi algorithm) to obtain a best POS tag sequence, and then providing that, and only that, tag sequence to a noun phrase algorithm. See for example, column 2, lines 44-47; column 6, lines 60-65; and column 9, lines 60-64. Specifically, Church states that the POS tag sequences "are then scored by the product of the lexical probabilities and the contextual probabilities, and the best sequence is selected." (emphasis added) column 6, lines 61-64.

Church then goes on to state "It will be noted that the noun phrase parsing, as described in FIG. 2, assumes the output from the part-of-speech assignment from FIG. 1 as its input." Column 9, lines 60-62.

It is thus clear that Church only contemplates a system in which POS tagging and noun phrase processing are two completely separate modules. It is also clear that Church does not contemplate or suggest how a plurality of POS tagging sequences could be processed in the noun phrase identifier algorithm.

Manning does nothing more than state that a plurality of POS tag sequences could be generated and it could be desirable to somehow use those in downstream parsing.

What is specifically lacking in both of the references, or in a combination of them, is any suggestion that one might use a plurality of POS tagging sequences to identify base noun phrases, and also any teaching, whatever, of how one might use a plurality of POS sequences to identify base noun phrases. This teaching is completely lacking in the references, and the Examiner has asserted no such teaching.

It is certainly much different to make a bald statement that something "could be done" than it is to teach _how_ something can be done. Even assuming, _arquendo_, that Manning somehow makes a bald statement that a plurality of possible POS sequences could be used to identify baseNPs (which it does not), there is absolutely no teaching in either of the references of how this could be done. Thus, such a bald statement cannot be used to render obvious the present invention.

Since neither of the references teach or suggest that a plurality of POS tag sequences could be used to identify base noun phrases, and since there is no teaching or suggestion, whatever, to indicate how one might combine the two references to accomplish a base noun phrase identifier that takes into account

multiple POS sequences, Applicant submits that the two references either alone or in combination simply cannot render obvious the present invention.

Specifically, independent claim 1 includes the steps of "identifying a plurality of N-best part-of-speech (POS) sequences corresponding to the natural language input; [and] identifying a likely base noun phrase (baseNP) sequence based on the N-best POS sequences identified [.]" Similarly, claim 10 includes "a base noun phrase (baseNP) identifier configured to receive a plurality of N-best part-of-speech (POS) tag sequences for the natural language input and identify a likely baseNP sequence of baseNPs corresponding to the natural language input, given the N-best POS tag sequences." In addition, independent claim 17 includes "identifying a plurality of N-best part-of-speech (POS) sequences corresponding to the linguistic input; [and] identifying one or more base noun phrases (baseNPs) for each of the N-best POS sequences to form a plurality of different possible baseNP sequences corresponding to each of the POS sequences [.]" Since neither of the reference either alone or in combination teach or suggest these features of the present invention, Applicant submits that independent claims 1, 10 and 17 are allowable.

In addition, dependent claim 3 further defines the step of identifying which of the plurality of baseNP sequences is most likely by "calculating a likely baseNP sequence that is most likely based on lexical information indicative of a position of words in the natural language input relative to baseNPs identified in the baseNP sequences". Similarly, claim 17 states that identifying a baseNP sequences as likely is "based on a probability of the associated POS sequence and a probability of the baseNP sequence, given lexical information indicative of a position of words in the linguistic input relative to the baseNPs identified in the baseNP sequence[.]" Further, claim 13 includes "a unified statistical model that includes lexical information

indicative of a position of words in the natural language input relative to baseNPs identified in the baseNP sequences."

Neither of the references, either alone or in combination, either teach or suggest this feature of the present invention. The Examiner pointed to column 9 of Church and asserted that column 9 teaches this feature. However, column 9 of Church indicates that statistical probabilities are calculated given a position of a <u>POS tag</u> relative to an opening bracket or closing bracket in a proposed noun phrase. Identifying the probability of a particular POS tag being the first or last POS in a noun phrase is different than identifying a <u>word position</u> within a base noun phrase. For example, the probability that a noun phrase begins with a noun may be very high. However, the probability that a noun phrase begins with a particular word (even though that word is a noun) may be much lower.

Therefore, the teaching that the probabilities are calculated which indicate how probable it is that a given POS tag begins or ends a noun phrase does not teach or suggest that calculating the probability a particular word, with a particular part of speech tag, resides at a given position within a noun phrase. These two calculations are simply different.

Thus, while Church does discuss the probability that a particular part of speech will begin or end a noun phrase, it simply does not teach or suggest using the probability associated with a word having a given position within a noun phrase in determining the probability associated with a base noun phrase. The teaching simply cannot be found in Church. Since claims 3, 13 and 17 specifically state that the likely base noun phrase is identified based on a position of words in the input relative to base noun phrases identified in the base noun phrase sequences, those claims are independently allowable over the references as well.

In conclusion, Applicant respectfully submits that independent claims 1, 10 and 17 are allowable over the references cited by the Examiner. Applicant also submits that a number of the dependent claims are independently allowable as well. Applicant further submits that all of the dependent claims are allowable by virtue of their dependence, either directly or ultimately, on the independent claims. Thus, reconsideration and allowance of claims 1-20 are respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: _____

Joseph R. Kelly, Reg. No. 34,847
Suite 1600 - International Centre
900 Second Avenue South
Minneapolis, Minnesota 55402-3319
Phone: (612) 334-3222 Fax: (612) 334-3312

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